4

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OPP OFFICIAL RECORD
HEALTH EFFECTS DIVISION
SCIENTIFIC DATA REVIEWS
EPA SERIES 361

MEMORANDUM

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

DATE: 29 May 2001

SUBJECT: Exposure/Risk Assessment of the Proposed New Uses of Imazapic Used On Pasture and Rangeland. PC Code: 129041. DP Code: 275220

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INTRODUCTION

The American Cyanamid Company has submitted applications for amendments to the registrations of Plateau® herbicide (Reg. No. 241-365) and Plateau® DG herbicide (Reg. No. 241-393) for use on "pasture, rangeland, (and) Conservation Reserve Program (CRP) land." Plateau® is a liquid formulation containing 2.0 lbs of the active ingredient imazapic per gallon. Plateau® DG is a 70% Dispersible Granule formulation packaged in water soluble packages. Imazapic is a contact herbicide that is rapidly absorbed by a plant's leaves and translocated throughout the plant causing mortality. The purpose of the proposed new uses is for "release" of desired prairie and other grass species by the elimination of undesirable weed species. Applications are most effective pre-emergence or early post-emergence. According to the labels, imazapic is currently registered for use on "noncropland areas such as railroad, utility, pipeline and highway rights-of-way, railroad crossings, utility plant sites, petroleum tank farms, pumping installations, non-agricultural fence rows, storage areas, non-irrigation ditch banks, prairie sites, airports, industrial turf, golf courses, recreational and non-residential turf and other similar areas." This document presents the Health Effects Division's (HED) estimates of pesticide handler exposure and risk that might result from the proposed new uses.

SUMMARY OF PROPOSED NEW USE PATTERN

Imazapic may be applied aerially, (fixed wing or helicopter), by ground equipment for broad area applications and by ground equipment or backpack for "spot treatments." The maximum rate of application is 0.19 lb a.i./Acre. There is a 7 day PreHarvest Interval (PHI) for areas cut for hay. The Restricted Entry Interval is 12 hours (proposed amended labels). Table 1.0 presents a summary of the proposed new use pattern.

Table 1.0 Summary of Proposed Use Pattern of Imazapic Applied to Pastureland, Rangeland and Conservation Reserve Program Land

Formulation	2.0 lb a.i./gallon liquid; 70% dispersible granule in WSP
Use Site	pasture, range, conservation reserve program land
Pest	"weed" species
Application Method	aerial, ground (broadcast and spot), backpack
Frequency/Timing	n/a
PHI	7 day for hay
REI	12 hours
Manufacturer	American Cyanamid Company

HANDLER EXPOSURE

In light of the proposed new use patterns, HED presents estimates of exposure and risk to a mixer/loader using open liquid pour and a mixer/loader/applicator as being the most conservative (i.e., worst case) handler functions involved with these proposed uses. Based on worker exposure study data in the Pesticide Handlers Exposure Database (PHED), in this case HED believes loaders supporting aerial operations receive the highest exposures due primarily to the large volumes of pesticide handled during the course of a work day and to the "method" of handling. In this assessment, liquid, open-pour loading is assessed. The DG formulation is packaged in water soluble packages which essentially eliminates loader exposure and is considered a closed loading system. In terms of applicators, HED believes that the most conservative (worst case) handler function is likely to be a handler who mixes, loads, and applies imazapic for spot treatment using high pressure "hand wand" equipment. For broadcast ground applications, ground boom application is most likely which would not result in as much exposure

as the mixer/loader/applicator using hand wand equipment. The proposed labels also list backpack as a method of application for spot treatments. Since backpack can potentially be a "high" exposure handler situation, an assessment for mixer/loader/applicator using liquid, open pour, for backpack application, is also presented.

There are no chemical specific data available with which to estimate pesticide handler exposure in this case. Therefore, study data contained in the Pesticide Handlers' Exposure Database (PHED) Surrogate Exposure Guide, Version 1.1 (August 1998) are used to estimate exposures. It is HED's policy to present estimates of dermal exposure for individuals wearing a single layer of clothing (i.e., long pants, long sleeved shirt, shoes plus socks) and wearing or not wearing gloves. This is done to the extent there are available data with which to do so. Both registered labels direct the handler to wear long sleeved shirt, long pants, shoes plus socks and waterproof gloves.

On 17 April 2001, the HED Hazard Identification Assessment Review Committee (Memo, W. Dykstra, HED Doc. No. 014560, 3 May 2001) met to discuss the adequacy of the toxicological database for imazapic and to establish toxicological endpoints with which to conduct exposure and risk estimates. Short and Intermediate term dermal toxicological endpoints were not established as no systemic toxicity was observed at the highest dose tested, (>1067.2 mg/kg bw/day) from a 21 day dermal toxicity study in rabbits. A Long-term dermal endpoint was established however Long-term dermal exposures are not expected from the proposed use patterns and therefore are not assessed.

Short-, Intermediate-, and Long-term inhalation endpoints were identified and they are 350 mg a.i./kg bw/day (for Short- and Intermediate- terms from rabbit developmental study) and a LOAEL of 137 mg a.i./kg bw/day (MOE 300 required) for Long-term inhalation. The latter is not assessed as long-term exposures are not expected.

Table 2.0 presents a summary of the exposure estimates.

Table 2.0 Estimated Exposures to Pesticide Handlers Applying Imazapic to Pasture, Range and Conservation Reserve Program Land				
Unit Exposure[1] mg a.i./lb handled	**Application Rate[2]** (maximum rate) lb a.i. handled/A	**Units Treated[3]**	**Average Daily Dose[4]** mg/kg bw/day	**Margin of Exposure[5]**
Mixer/Loader - Liquid - Open Pour - Supporting Aerial Application				
Inhalat. 0.0012 HC	0.19	1200 A/day	$4.56x10^{-3}$	>76K
Mixer/Loader/Applicator - Liquid/Open Pour - High Pressure - HandWand				
Inhalat. 0.12 LC	0.19	1000 gallons spray/day[3] (20.8 lb a.i./day)[3a]	0.042	>8K
Mixer/Loader/Applicator - Liquid/Open Pour - Back Pack				
Inhalat. 0.03 LC	0.19	40 gallons spray/day[3] (0.83 lb a.i./day)[3b]	$4.15x10^{-4}$	>800K

1. Unit Exposure = mg a.i./lb a.i. handled; taken from the Pesticide Handler's Exposure Database PHED Surrogate Exposure Guide version 1.1; August 1998; Inhalat. = Inhalation. HC = high confidence data; LC = low confidence data
2. Application Rate from proposed amendments Plateau® and Plateau® DG herbicide labels (Reg. No's. 241365 and 241-393)
3. units Treated from Science Advisory Council for Exposure Policy No. 9 Rev. 5 July 2000
The Plateau label (2.0 lb a.i./gallon) lists 12 oz/A as the maximum rate of application. Therefore 2.0 lb a.i./gal ÷ 128 fl oz/gal = 0.016 lb a.i./fl oz and at 12 oz/A = 0.19 lb a.i./A.
a. Further, for spot treatments the label directs the use of 1.3 oz/gallon of water ∴ 1.3 oz * 0.016 lb ai/fl oz = 0.021 lb ai/gal * 1000 gal/day (Sci. Expo. Council Policy) = 21.0 lb ai/day
b. 0.021 lb ai/gal * 40 gal/day (Sci. Expo. Counc) = 0.83 lb ai/day
4. Average Daily Dose (ADD) = Unit Exposure * Application Rate * Units Treated (or lb a.i./day) ÷ 60 kg body weight (NOAEL from developmental study). Inhalation exposure assumes 100% inhalation absorption.
5. Margin of Exposure (MOE) For Short and Intermediate Term Inhalation = No Adverse Effect Level (350 mg a.i./kg bw/day) ÷ ADD. K = 1000

POST-APPLICATION EXPOSURE

HED believes that the only likely post-application exposure that might occur to agricultural workers is scouting. The Science Advisory Council for Exposure (Policy No. 003.1 - Rev. 7 August 2000) lists irrigation, scouting, and mechanical harvesting as activities that might follow pesticide application to alfalfa. HED considers pastures that may be cut for hay to be similar to alfalfa in some respects. It is unlikely that pastures are irrigated with methods requiring hand labor. In HED's view, scouting is the most likely, if any, post-application activity that might occur following an herbicide application for grass "release" to pastures or prairie land and that could result in significant human exposure.

It is mechanically baled whether the large round or "cube" bales or "small" (i.e., typical) bales. The large round or cube bales are mechanically handled for storage or shipment or movement. Many operations use a "kicker" to pick up small bales and "load" them loose into a wagon. Some small operations may use manual labor to pick up and load bales as well as stack them for storage. In this last case, workers typically wear gloves to protect their hands from abrasion from the hay bales and binder twine. These factors combined with a 7 day preharvest (mowing) interval lead HED to conclude that any dermal exposure that might occur is expected to be negligible.

Since no dermal toxicological endpoints are identified and since inhalation post-application exposures are expected to be negligible, a post-application exposure assessment is not presented here.

INCIDENTS

According to REFs Reports (5/16/01), one incident regarding Plateau herbicide was reported. A male caller "accidentally touched his mouth with Plateau herbicide." After he rinsed his mouth, symptoms subsided.

SUMMARY

In view of the preceding discussion and since the estimated inhalation Margins of Exposure exceed 100, the estimated exposures are not of concern to HED.

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Non-Dietary Exposure Review

Subject:	**Exposure/Risk Assessment of the Proposed New Uses of Imazapic Used On Pasture and Rangeland. PC Code 129041. DP Code 275220.**
Guidelines:	
Other:	**Exposure/Risk Assessment**
DP Barcode:	**D275220**
MRIDs:	
Chemical Codes:	**129041 3-Pyridinecarboxylic acid, 2-(4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl)-5-methyl-, (.+-.)- (9CI) (CAS 104098-48-8)**
Formulation Type:	**Granular, Liquid**
Exposed Individual:	**Applicator, Mixer/Loader**
Application Method:	**Aerial - fixed wing, Backpack, High Pressure hand wand (Chem-Lawn type)**
Outdoor Use Sites:	**Non-Crop**
Indoor Use Sites:	
Greenhouse Use Sites:	
Other Use Sites:	
Airborne Techniques:	
Dermal Techniques:	
Hand Techniques:	
Foliar Techniques:	
Indoor Surf. Techniques:	
Reviewers:	**Mark I. Dow**
Review Approvers:	**George Herndon Approved on:**

6.